African Invertebrates Vol. 47 Pages 321–334 Pietermaritzburg December, 2006

Ocypodomyia gen. n. from the seashores of the Afrotropical region (Diptera: Muscidae: Limnophorini)

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ABSTRACT

Ocypodomyia gen. n. is described for the two species *stuckenbergi* sp. n. (Madagascar, Seychelles) and *africana* sp. n. (Angola, Gambia, Senegal). The species are closely associated with the burrows of crabs of the genus *Ocypode* Weber. The genus is assigned to the tribe Limnophorini.

KEY WORDS: Diptera, Muscidae, new genus, new species, Afrotropical, seashore.

INTRODUCTION

The two new species forming the new genus described here have been known to me for several years, and were first brought to my attention by Dr Brian Stuckenberg of the Natal Museum, Pietermaritzburg. Dr Stuckenberg collected a series of specimens from the seashores of Madagascar and Angola, closely associated with the burrows of crabs of the genus *Ocypode* Weber. I have also received a small number of additional specimens from the West African coast (Senegal, Gambia) and the Indian Ocean islands of Aldabra and Cosmoledo.

These two new species present a number of striking and unusual morphological features, several of which reflect the unusual habitat of the adult flies. However, the internal characters of the male and female genitalia demonstrate that these species represent a new and distinctive genus of the muscid tribe Limnophorini.

In general, the Afrotropical Muscidae can be identified with the monograph of Emden (1951), with some revised generic assignments and the post-1951 species listed by Pont (1980).

MATERIAL AND METHODS

The material studied is located in the following museums (codens in parentheses): The Natural History Museum, London, U.K. (BMNH); Muséum National d'Histoire Naturelle, Paris, France (MNHN); Natal Museum, Pietermaritzburg, South Africa (NMSA); National Museum of Wales, Cardiff, U.K. (NMWC); National Museum of Natural History, Washington, D.C., U.S.A. (USNM).

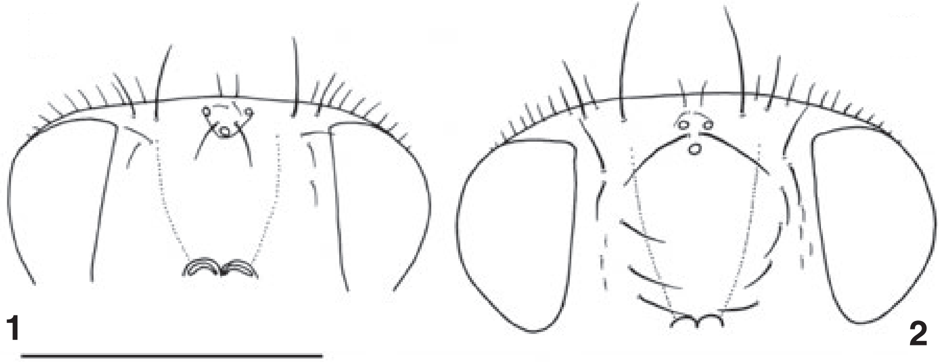
Descriptive terminology is based mainly on McAlpine (1981).

TAXONOMY

Ocypodomyia gen. n.

Etymology: From *Ocypode*, a genus of ghost and sand crabs, and *-myia* (Greek, a fly). The name reflects the association between these flies and *Ocypode* crabs.

Type-species: *Ocypodomyia stuckenbergi* sp. n., by present designation.

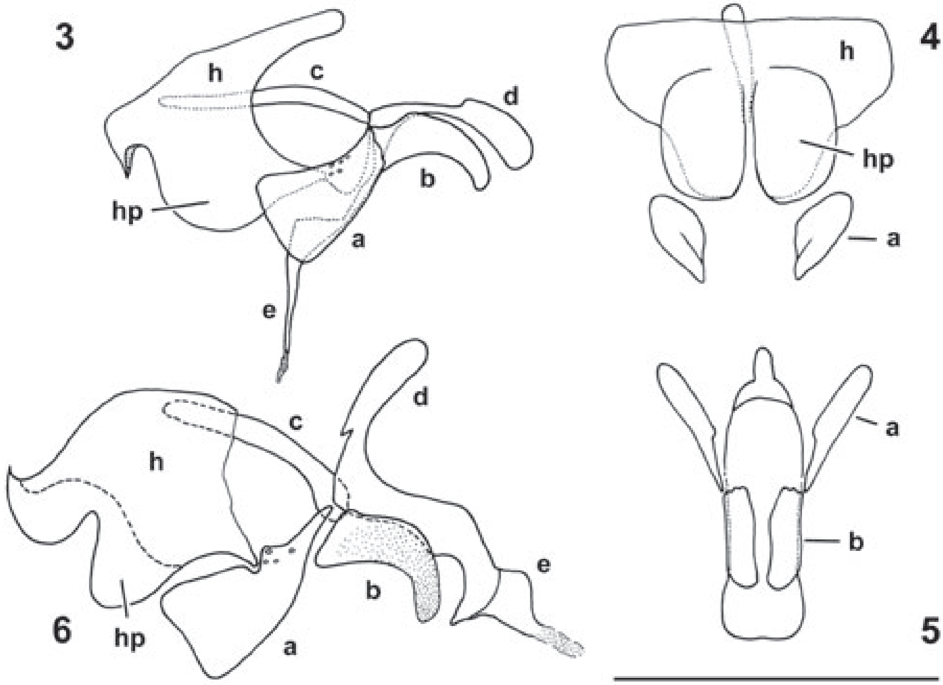


Figs 1, 2. Male frons, dorsal view: (1) *Ocypodomyia stuckenbergi* sp. n. (Madagascar, Sainte-Luce); (2) *Ocypodomyia africana* sp. n. (Angola, Cuanza R.). Scale bar = 1 mm.

Systematic position: A genus belonging to the tribe Limnophorini of the subfamily Coenosiinae: frontal vitta without setae; anepimeron bare; lower calypter of the *Phaonia*-type, i.e. narrow and tongue-like; prealar seta absent; lower proepimeral setulae directed upwards; katepisternal setae not arranged at the points of an equilateral triangle; male hypandrium cup-like, not elongated and tube-like; female ovipositor with the cerci adpressed against the terminal membrane, not free-lying and projecting beyond epiproct and hypoproct.

Diagnosis: *Ocypodomyia* may be immediately recognised by a number of autapomorphies: the structure of the frons, which in both sexes is broad, entirely silvery and without apparent division into fronto-orbital plates, frontal vitta and ocellar triangle, and with all the setae greatly reduced, more like setulae than setae (Figs 1, 2); the male genitalia which have two striking features, namely the broad and spade-like praegonite, and the pair of large rounded bulbous ventral prolongations on the hypandrium (Figs 3, 6); the female ovipositor in which sternite 7 is atrophied, reduced to a pair of hind-marginal bristle-dots (Fig. 9).

Description: Entire head except for eyes and antennae silvery-white pruinose. Frons short and very broad in both sexes, profrons high (Figs 10–12, 17, 20). Frons uniform in appearance, with a differentiation into fronto-orbital plates, frontal vitta and ocellar triangle almost undetectable (Figs 2, 13, 21). Head setae reduced and setula-like (Figs 1, 2, 13, 21). Lower facial margin narrow, the vibrissae unusually close together (Fig. 11). Prementum of proboscis glossy, undusted. Prosternum with or without setulae. Proepisternal depression with or without setulae. Katepisternals 1+2. Meron with or without a few short setulae below spiracle. Mid femur with 0 anterior and 2 posterior preapical setae. Hind tibia with 1 dorsal but 0 anterodorsal preapical seta. Veins bare, but vein R_{4+5} sometimes with a few setulae at base. Sternite 1 with setulae at sides. Male hypandrium with a pair of large rounded bulbous prolongations ventrally (Figs 4, 5), phallapodeme and epiphallus well developed, praegonite large, spade-like, postgonite curved, without setulae, aedeagus long and slender, the tip membraneous, without trace of any armature (Figs 3, 6). Female ovipositor (Figs 7–9) with tergites 6–8 present as paired sclerites, complete; sternite 7 reduced to a pair of hind-marginal bristle-dots; epiproct, hypoproct and cerci without spines, only with setulae.

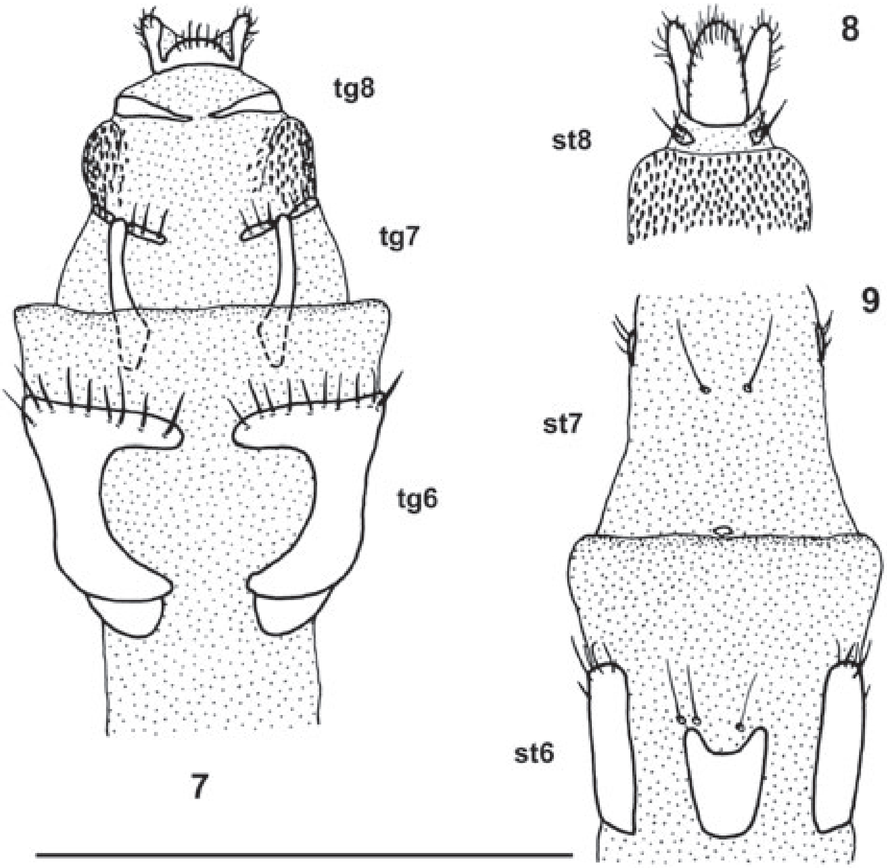


Figs 3–6. Male genitalia of species of *Ocypodomyia* gen. n.: (3–5) *O. stuckenbergi* sp. n. (Madagascar, Ambohitantely): (3) aedeagus, lateral view, (4) hypandrium, anterior view, (5) aedeagus, ventral view; (6) *O. africana* sp. n. (Senegal, Plage Somone), aedeagus, lateral view. Abbreviations: a – praegonite, b – postgonite, c – phallapodeme, d – epiphallus, e – distiphallus, h – hypandrium, hp – paired hypandrial prolongations. Scale bar = 0.5 mm.

Discussion: These two species are remarkable in their general appearance, being small and almost wholly silvery-white in colour. The characters of *O. stuckenbergi* place it very close to the genus *Spilogona*, and at first I considered it to be a highly derived species of that genus. The characters of the second species (*O. africana*) could place it in the genus *Limnophora* Robineau-Desvoidy, and again, I originally considered it to belong to that genus. My original conclusion was that the resemblance in external characters was homoplaseous and the result of similar habits, namely living on the seashore in the burrows of *Ocypode* crabs. However, study of the male and female genitalia immediately showed that the resemblance between these two species was not homoplasy but did indeed indicate a very close relationship.

In the male genitalia of both species of *Ocypodomyia*, the pair of large rounded bulbous ventral prolongations of the hypandrium is a unique feature within the Limnophorini, as is the large and spade-like praegonite (Figs 3–6).

Spilogona Schnabl is a large and probably paraphyletic genus at the base of the tribe Limnophorini. In my view, an elongated female ovipositor is a ground-plan character of the tribe and of *Spilogona*, and among many species of *Spilogona* and in the other limnophorine genera there is a progressive shortening of the ovipositor, with concomitant modification of the tergites and sternites. An ovipositor such as that of *Spilogona nitidicauda* Schnabl (Holarctic) is probably close to the ground-plan of the



Figs 7–9. Ovipositors of species of *Ocypodomyia* gen. n.: (7, 8) *O. stuckenbergi* sp. n. (Madagascar, Sainte-Luce): (7) dorsal view, (8) ventral view, sternite 8; (9) *O. africana* sp. n. (Angola, Cuanza R.), ventral view, sternites 6, 7. Abbreviations: tg – tergite, st – sternite. Scale bar = 1 mm.

Limnophorini—tergites 6, 7 and 8 are represented by paired long plates, sternites 6 and 7 by long plates, and sternite 8 by a pair of small platelets. In *Ocypodomyia* (Figs 7–9), tergite 7 is reduced to more rod-like structures and tergite 8 is reduced to two narrow transverse plates that extend down the side of the ovipositor, thus giving additional rigidity to the terminal part of this shortened organ. Sternite 7 is reduced to two hind marginal bristle-dots.

Two Palaearctic genera of the Limnophorini, *Neolimnophora* Schnabl & Dziedzicki and *Villeneuvia* Schnabl, together include three species that are found on the shores of the North Sea and the Mediterranean Sea. They are much larger and darker species, and share certain apomorphies with *Ocypodomyia* (e.g. lower facial margin narrow, and vibrissae close together) but the differences are much greater (meron and sternite 1 bare, 4 postsutural dorsocentral setae, head structure and setation very different).

Some of the morphological features (large head, reduced eyes, large antennae, reduced head setae) are adaptations by species to life in burrows and tunnels. For example, the reduction in eye size is a recognised feature of Muscidae and Anthomyiidae associated with the burrows of marmots (*Marmota marmota* Linnaeus) in the European Alps (Pont & Ackland 1995). The strikingly pale body appearance and the broad silvery frons are typical features of many seashore Diptera (e.g. Asilidae, Therevidae, Ephydridae, Chamaemyiidae, Anthomyiidae, Muscidae). The densely silvery pruinose frons of *Ocypodomyia* resembles macroscopically the frons of the seashore flies discussed by Bethmann and Haupt (2005), who showed that this consists of a dense layer of microtrichia which are of importance for enhanced light scattering and thermoregulation under the harsh conditions of heat and radiation in the seashore environment.

Dr Stuckenberg (pers. comm.) kindly supplied the following information on his captures of these flies and their association with *Ocypode* crabs:

> *Ocypode* species live as scavengers on the upper beach levels, and have special morphological adaptations that enable them to extract water from damp sand for storage in their gill cavities, thereby allowing them to live permanently out of water. Each crab excavates a burrow downwards into the sand, which it maintains and defends; the burrows usually terminate at the water-table level in the sand, and may go to a depth as much as one metre. The *Ocypodomyia* flies were observed to rest on the shaded sides in the burrows; they flew out when closely approached, and were easily caught by quickly placing a net over a burrow entrance. The burrows provide uniformly stable, cool and humid microhabitats, suited to such small flies living in the demanding environment of open beaches. The considerable surface area presented by the burrow walls could provide not only sheltered domiciles, but possibly also breeding sites. The fly larvae may exploit the resource of interstitial meiofauna, such as the abundant minute nematode worms and harpacticoid copepods.

Dr C.E. Dyte (pers. comm.) described his experience of collecting *Ocypodomyia* in Gambia as follows:

> They were not very common, and only seen when disturbed, e.g. when a little sand was thrown in the *Ocypode* burrow, they flew out. However they were rapid fliers and were easily missed with a net. I found the best way to capture them was to hold the net in one hand with the frame horizontally, and with the fingers of the other hand lift up the apex of the net-bag so as to make a 'tent'. When this 'tent' was lowered over the burrow entrance with a sharp smack the flies, if present, flew out into the 'tent' and were secured.

The predacious habit of the adults can be inferred from the structure of the proboscis which is typical for predaceous adults of the Limnophorini (Werner & Pont 2006): fulcrum slightly longer than theca; theca when dissected broad, bare except for a few setulae at base and at tip, when dry almost forming a closed tube with the labrum; discal sclerite U-shaped, but discal tooth not developed; 9 pairs of pseudotracheae; 4 pairs of short, stout and strongly sclerotised prestomal teeth.

The larvae may be presumed to be obligate carnivores like those of all other known Limnophorini (Skidmore 1985). It is probable that they live in damp sand at the base of the crab burrows in which the adults were found, as suggested by Dr Stuckenberg. This is certainly suggested by two females (Senegal and Gambia) which have the ptilinal sac still largely extruded and with several grains of sand stuck to it.

Key to species of *Ocypodomyia* gen. n.

1 Prosternum bare; frontal setae absent (Fig. 1) or very weakly developed (Fig. 13); ♂ abdomen without dark spots .... **stuckenbergi** sp. n.

– Prosternum setulose; frontal setae (Figs 2, 21) well developed; ♂ abdominal tergites 3 and 4 each with a pair of small black subtriangular spots .... **africana** sp. n.

Ocypodomyia stuckenbergi sp. n.

Figs 1, 3–5, 7, 8, 10–16

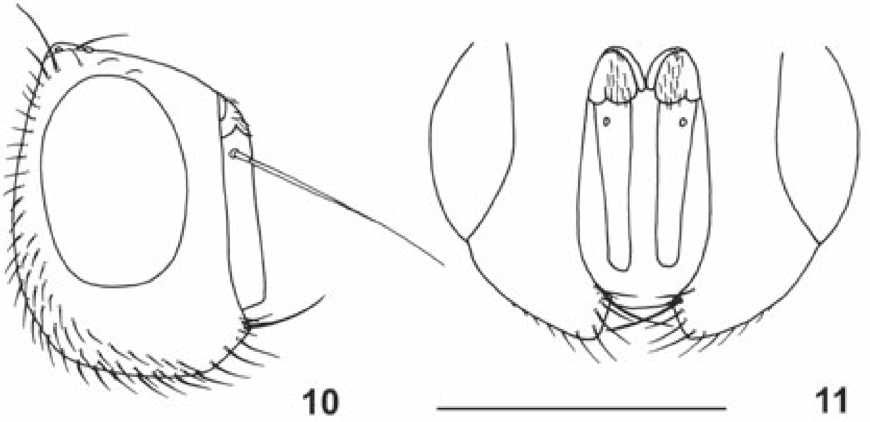
Etymology: The species is named after its collector, the eminent South African dipterist Brian R. Stuckenberg.

Description:

Male.

Head: Ground-colour black. Eyes bare. Entire head except for eyes and antennae silvery-white pruinose. Frons short and very broad, at lunula 0.6 of head-width at this point (Fig. 1), broadening slightly from vertex to lunula. Ocellar setae very short; inner and outer verticals short, the outer 2/3 as long as the inner and equal to an ocellar seta in length. Post-ocular setulae in a single row. Frons uniform in appearance, with a differentiation into fronto-orbital plates, frontal vitta and ocellar triangle almost undetectable. 2–5 pairs of very short proclinate frontal setulae on lower 2/3 of frons, these sometimes minute and scarcely detectable, and above them with 2 pairs of equally short proclinate orbital setulae, these all usually arranged irregularly. Profrons very high, so that the face and antennae are unusually long (Fig. 10), the distance from profrons to ocellar seta equal to half the distance from profrons to vibrissa. Antennae black, the apical part of pedicel orange, the flagellomere with grey pruinosity visible from some angles. Flagellomere very long, in lateral view reaching almost to level of vibrissa. Arista mainly orange, bare. Parafacial broad, at narrowest point almost as wide as width of flagellomere. Face narrow and very sunken, with a sharp vertical carina along its length, and lower anterior part of head much enlarged as a result. Lower facial margin narrow, the vibrissae unusually close together (Fig. 11). Facial ridges bare. Vibrissae strong, crossed. Gena broad, below lowest eye-margin equal to half depth of an eye; bare except for a row of setae along lower margin. Proboscis short, slender, the prementum glossy dark brown. Palpus orange to brown, slender.

Thorax: Ground-colour black. Wholly whitish, almost silvery-white dusted, without dark vittae or spots anywhere on scutum, scutellum or pleura. Spiracles white. All setae short. Acrostichal setulae 2-serial at first, 3- to 4-serial at suture, with a very weak



Figs 10, 11. Male head of *Ocypodomyia stuckenbergi* sp. n. (Madagascar, Sainte-Luce): (10) head, lateral view; (11) face, frontal view. Scale bar = 1 mm.

prescutellar pair of setae; 2+3 dorsocentrals; 1+2 intra-alars; postsutural setae weak; 1+1 supra-alars; 2 postpronotals; prealar absent; 2 postalars. Prosternum, proepisternal depression and anepimeron bare. Notopleuron with 2 setae, otherwise bare. Proepisternum and proepimeron each with 1 seta and 1 setula, all directed upwards. Anepisternum with 4 setae in posterior row, and a strong setula in upper anterior corner; 1+2 katepisternals, the lower one much shorter than the upper two and closer to upper posterior than to upper anterior seta. Meron with 2–4 short setulae below spiracle. Posterior spiracle without setulae on margin. Katatergite pilose. Anatergite bare. Scutellum with 1 pair of sub-basal lateral and 1 pair of apical setae; disc with 13–20 setulae; lateral margins and ventral surface bare.

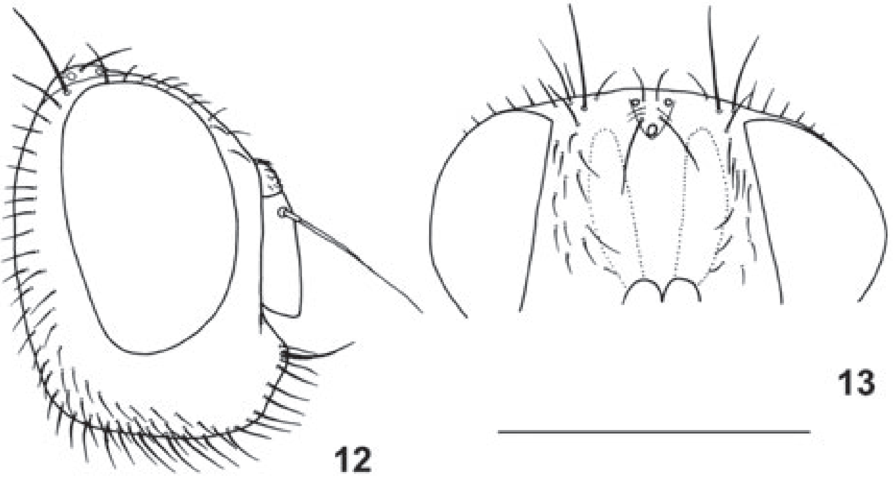
Legs: Coxae dark; trochanters orange; femora narrowly orange-yellow at base and at tip, otherwise dark and grey dusted; tibiae and tarsi orange-yellow, some partial darkening in apical part of tibiae. Without modifications in structure or setation. Fore femur with a posteroventral row, the setae weaker in basal half. Fore tibia with a short submedian posterior seta, absent in most of the Aldabra specimens; 1 dorsal and 1 short posteroventral apical setae. Mid femur without ventral setae; with a submedian anterior seta; 0 anterior and 2, rarely 1, posterior preapical setae. Mid tibia with 2 posterior setae, without anterodorsals or ventrals. Hind femur with 2–4 anteroventral setae in apical half, otherwise only with setulae on this surface; posteroventral surface with rather longer setulae in basal half; with an anterodorsal row, the setae becoming more dorsal towards apex; 1 dorsal and 0 posterodorsal preapical seta. Hind tibia with 1 anterodorsal and 1, rarely 2, anteroventral seta(e), without posterodorsal; 1 dorsal but no anterodorsal preapical seta; 1 anteroventral but no posteroventral apical seta. Hind tarsomere 1 with a short ventral setula near base.

Wing: Clear, the surface entirely covered with microtrichia and appearing rather milky. Basicosta and tegula yellow. Veins yellow. Costa continuing round wing-tip to the apex of vein M, the costal spine tiny. Veins bare except for costa. Subcosta running in a somewhat sinuous course from humeral cross-vein to costa, not in a smooth curve. Cross-vein r–m below or slightly beyond the point where vein R_1 enters costa. Cross-vein dm–cu upright, straight. Vein M running straight to wing-margin, not inclined forwards. Vein A_1 extending over halfway from its base to wing-margin. Calypters white, including margins. Lower calypter of the *Phaonia*-type and projecting well beyond upper one. Haltere with the stem orange and the knob pale yellow.

Abdomen: Ground-colour black. Dorsal surface wholly white, almost silvery-white dusted, without any dark markings. Tergites without setae, except for tergite 5 which has 2 or 3 pairs of lateral discals and a row of marginals. Ventral part of tergites and sternites whitish dusted. Sternite 1 narrow, with a short fine setula on each side, sometimes with several. Sternite 5 with the lobes broad, pale (Fig. 14).

Genitalia: Cercal plate deeply cleft dorsally and ventrally (Fig. 15). Surstyli simple (Fig. 16). Hypandrium with a pair of large rounded bulbous prolongations ventrally. Phallapodeme and epiphallus well developed. Praegonite large, spade-like; postgonite curved, without setulae. Aedeagus long and slender, the tip membraneous, without trace of any armature.

Measurements: Length of body, 2.8–3.3 mm. Length of wing, 2.3–2.8 mm.



Figs 12, 13. Female head of *Ocypodomyia stuckenbergi* sp. n. (Madagascar, Sainte-Luce): (12) head, lateral view; (13) frons, dorsal view. Scale bar = 1 mm.

Female.

Differs from the male as follows:

Head (Figs 12, 13): Proportions slightly different, and the setulae rather stronger and more numerous. Frons at lunula also 0.6 of head-width at this point. Ocellar and vertical setae longer and stronger. 2 or 3 pairs of short proclinate frontals, and above them with 2 pairs of orbitals, the lower one proclinate, the upper one directed backwards and usually outwards, and outside them on the fronto-orbital plate with a few (rarely 6 or 8) short proclinate setulae. Profrons not so high and therefore less angular, the distance from profrons to ocellar tubercle 0.7 the distance from profrons to vibrissa. Antennal flagellomere (and face) much shorter, 2.5 times as long as wide. Parafacial broader, slightly wider than width of flagellomere. Lower anterior part of head not so enlarged, and mouth-margin reaching forwards beyond level of profrons in profile. Gena rather narrower, below lowest eye-margin equal to only 0.3 of the depth of the eye.

Thorax: Rarely up to 23 discal setulae on scutellum.

Legs: Hind femur with only 1 or 2 anteroventral setae, and the posteroventral setulae not developed.

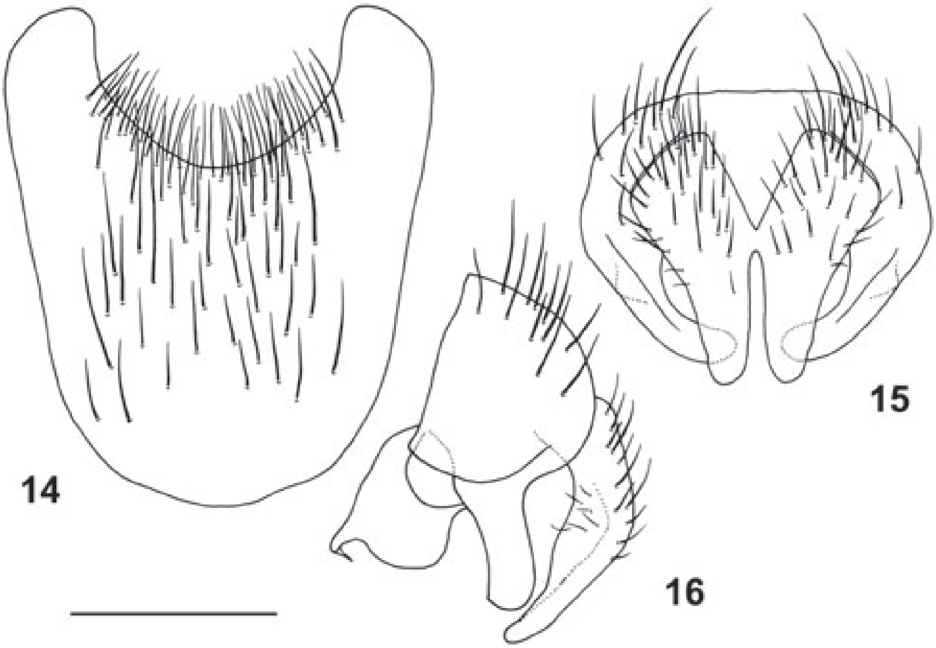
Abdomen: Tergite 5 with the marginal setae weak, only 2 pairs.

Ovipositor (Figs 7, 8): Very fragile and difficult to dissect. Tergite 6 as two broad plates; sternite 6 as a narrow median rod. Tergite 7 as a pair of strongly sclerotised rods, each with a pair of small platelets at tip; sternite 7 absent, represented by a pair of bristle-dots. Tergite 8 as a pair of bars running down the side of the ovipositor; sternite 8 as a pair of small hind-marginal platelets. Membrane between segments 7 and 8 with tiny spicules. Epiproct, hypoproct and cerci setose, without spines. 3 spherical spermathecae.

Measurements: Length of body, 3.7–4.5 mm. Length of wing, 2.8–3.4 mm.

Holotype: ♂ MADAGASCAR: *Tuléar*: Fort-Dauphin, Sainte-Luce, alt. 10 m, 22–24.ii.1958, B. Stuckenberg (NMSA).

Paratypes: MADAGASCAR: *Tuléar*: same locality data as holotype, 3♂ 5♀ (2♂ 4♀ NMSA, 1♂ 1♀ BMNH); Saint-Augustin, alt. 6 m, 11–13.ii.1958, B. Stuckenberg, 1♂ (NMSA); *Antananarivo*: Ankazobe,



Figs 14–16. Male genitalia of *Ocypodomyia stuckenbergi* sp. n. (Madagascar, Ambohitantely): (14) sternite 5, dorsal view; (15) hypopygium, dorsal view; (16) hypopygium, lateral view. Scale bar = 1 mm.

Ambohitantely, alt. 1600 m, 4–9.xii.1957, B. Stuckenberg, 1♂ (NMSA); *Toamasina*: Fenerive, lagoon shore, xii.1955, B. Stuckenberg, 4♂ 1♀ (3♂ 1♀ NMSA, 1♂ BMNH). SEYCHELLES: *Aldabra*: Picard, Gigi, 19–20.iii.1986, W.N. Mathis, 2♂ 6♀ (1♂ 4♀ USNM, 1♂ 2♀ BMNH); Picard, Gigi, 24.iii.1986, W.N. Mathis, 1♂ (USNM); *Cosmoledo*: Menai I., station, 26.iii.1986, W.N. Mathis, 1♀ (USNM).

Discussion: The abdomen of one macerated female contained some 14 complete eggs together with the remnants of several others. The egg is white, simple, boat-shaped, with a pair of dorsal pleats, without any projections or ornamentations at the tips.

Distribution: Known only from Madagascar and the Indian Ocean islands of Aldabra and Cosmoledo.

Ocypodomyia africana sp. n.

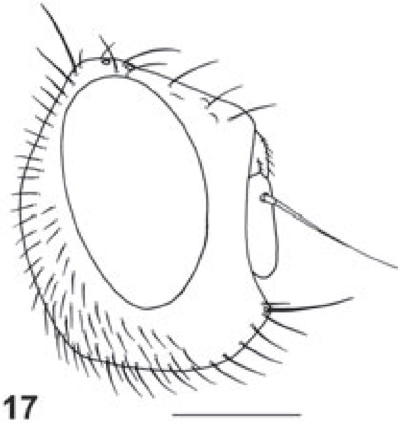
Figs 2, 6, 9, 17–23

Etymology: The species name refers to the distribution of the species.

Description:

Male.

Head: Ground-colour black. Eyes bare. Entire head except for eyes and antennae silvery-white pruinose. Frons broad, narrowing from vertex towards middle and then broadening again to lunula, at lunula 0.4 of head-width at this point, at middle 0.45 of head-width at this point (Fig. 2). Ocellar setae short; inner and outer verticals short, the outer 2/3 as long as the inner and half as long as an ocellar seta. Row of post-ocular setulae with a partial or complete second row. Frons uniform in appearance, with a differentiation into fronto-orbital plates, frontal vitta and ocellar triangle almost undetectable; 3 or 4 pairs of short frontal setulae from lunula to level of anterior ocellus, these directed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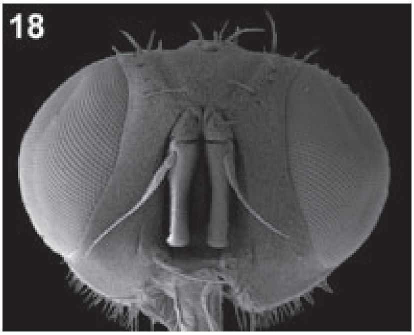
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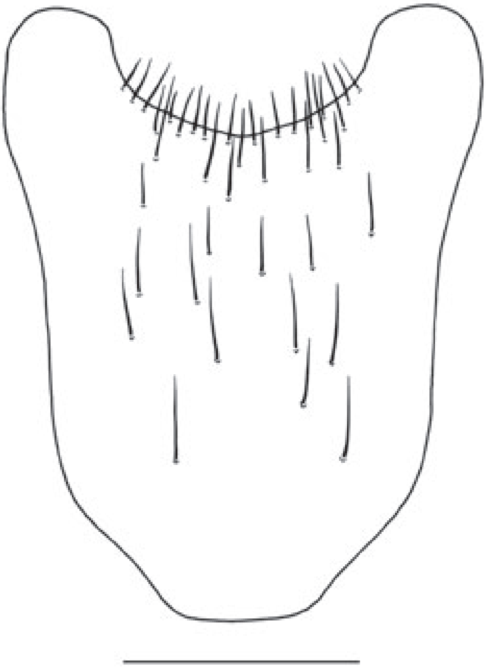
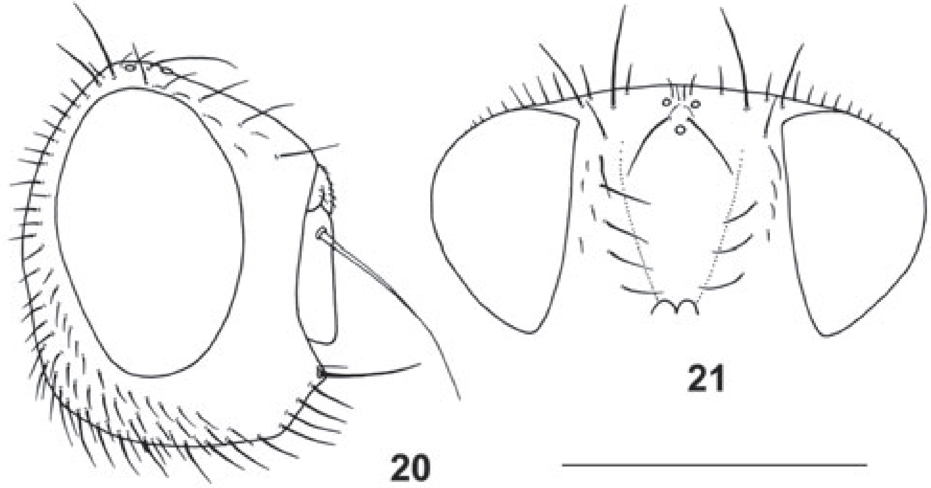


Figs 17–19. *Ocypodomyia africana* sp. n. (17) male head, lateral view (Angola, Cuenza R.); (18) SEM of male head, frontal view (Gambia, Tanji Bird Reserve); (19) male sternite 5, dorsal view (Senegal, Plage Somone). Scale bars = 0.5 mm.

forwards and slightly inwards, and above them with a pair of equally short reclinate orbital setulae; 1 or 2 short setulae outside them on fronto-orbital plate. Profrons high, so that the face and antennae are unusually long (Figs 17, 18), the distance from profrons to ocellar seta equal to 0.8 of the distance from profrons to vibrissa. Antennae black, the apical part of pedicel sometimes orange, the flagellomere with grey pruinosity visible from some angles. Flagellomere very long, in lateral view reaching almost to level of vibrissa. Arista sometimes partly orange, bare. Parafacial broad, at narrowest point wider than width of flagellomere. Face narrow and very sunken, with a low vertical carina along upper part at least, and lower anterior part of head much enlarged as a result. Lower facial margin narrow, the vibrissae unusually close together. Facial ridges bare. Mouth-margin reaching forwards beyond level of profrons. Vibrissae strong, crossed. Gena broad, below lowest eye-margin equal to a quarter of an eye-depth; bare except for a row of setae along lower margin. Proboscis short, slender, the prementum glossy dark brown. Palpus dark brown, slender.

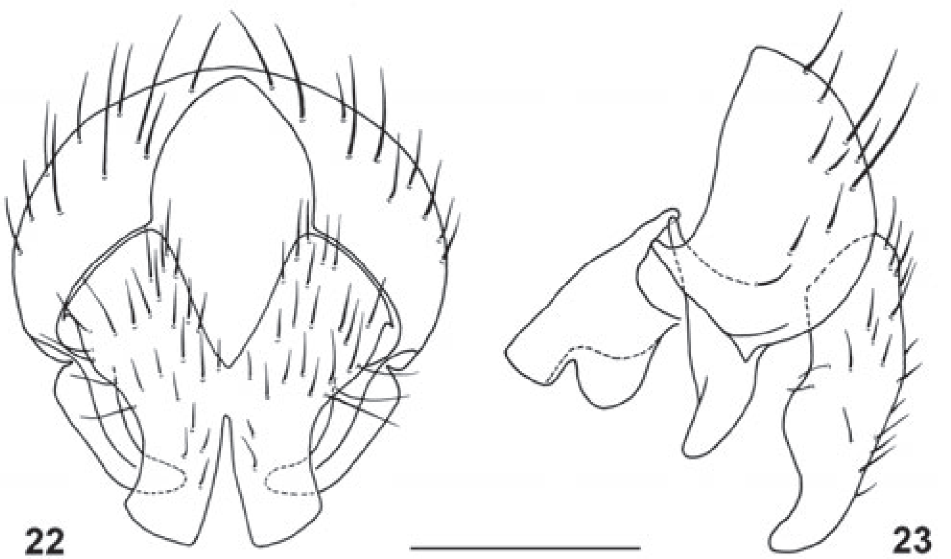
Thorax: Ground-colour black. Wholly whitish, almost silvery-white dusted, with dark bristle dots at the base of most dorsal setae, in 1♂ with an inconspicuous small grey-dusted spot on each side between 1st postsutural dorsocentral and suture, otherwise scutum, scutellum and pleura unmarked. Spiracles white. All setae short. Acrostichal



Figs 20, 21. Female head of *Ocypodomyia africana* sp. n. (Angola, Cuanza R.): (20) head, lateral view; (21) frons, dorsal view. Scale bar = 0.5 mm.

setulae 2- to 3-serial at first, 3- to 4-serial at suture, with a very weak prescutellar pair of setae; 2+3 dorsocentrals; 1+2 intra-alars, the postsutural setae very fine and weak; 1+1 supra-alars; 2 postpronotals; prealar absent; 2 postalars. Prosternum with 2 or several pairs of setulae on margin. Notopleuron with 2 setae, otherwise bare. Proepisternum with 1 strong and 1 moderate seta; proepisternal depression with 1 or 2 fine setulae or bare. Proepimeron with 1 seta and 1–3 tiny setulae, all directed upwards. Anepisternum with 4 setae in posterior row, and a strong setula in upper anterior corner. Anepimeron bare; 1+2 katepisternals, upper posterior one twice as long as the other two, lower one much closer to upper posterior than to upper anterior seta. Meron with or without 1 or 2 short setulae below spiracle. Posterior spiracle without setulae on margin. Katatergite pilose. Anatergite bare. Scutellum with 1 pair of sub-basal lateral and 1 pair of apical setae; disc rather densely setulose, with up to 29 setulae; lateral margins and ventral surface bare.

Legs: Coxae dark; trochanters orange; femora narrowly orange-yellow at base and at tip, otherwise dark and grey dusted; tibiae brownish, broadly orange-yellow in basal part to mainly orange-yellow; tarsi brown. Without modifications in structure or setation. Fore femur with a posteroventral row, the setae weaker in basal half. Fore tibia without a submedian posterior seta; 1 dorsal and 1 very short posteroventral apical setae. Mid femur with some short posteroventral setae in basal half, otherwise without ventral setae; with a submedian anterior seta, and some shorter setae basad of this; 0 anterior and 2 posterior preapical setae. Mid tibia with 2 posterior setae, without anterodorsals or ventrals. Hind femur with 2–4 anteroventral setae in apical half, otherwise only with setulae on this surface; posteroventral surface with several short setae in basal half; with an anterodorsal row, the setae becoming more dorsal towards apex; 1 dorsal and 0 posterodorsal preapical seta. Hind tibia with 1 anterodorsal and 1 anteroventral setae, without posterodorsal; 1 dorsal but no anterodorsal preapical seta; 1 anteroventral but no posteroventral apical seta. Hind tarsomere 1 without a ventral setula.



Figs 22, 23. Male genitalia of *Ocypodomyia africana* sp. n. (Senegal, Plage Somone): (22) hypopygium, dorsal view; (23) hypopygium, lateral view. Scale bar = 0.5 mm.

Wing: Clear, the surface entirely covered with microtrichia and appearing rather milky. Basicosta and tegula yellow. Veins yellow. Costa continuing round wing-tip to the apex of vein M, the costal spine tiny. Veins bare, except for costa and vein R_{4+5} where 1 or 2 dorsal and ventral setulae may be present at base or absent. Subcosta running in a somewhat sinuous course from humeral cross-vein to costa, not in a smooth curve. Cross-vein r–m below or slightly beyond the point where vein R_1 enters costa. Cross-vein dm–cu upright, straight or (usually) rather sinuous. Vein M running straight to wing-margin, not inclined forwards. Vein A_1 extending over halfway from its base to wing-margin. Calypters white, including margins. Lower calypter of the *Phaonia*-type and projecting well beyond upper one. Haltere with the stem orange and the knob pale yellow.

Abdomen: Ground-colour black. Dorsal surface white, almost silvery-white dusted; tergites 3 and 4 each with a pair of small black subtriangular spots, well separated by dust from each other and from the side margins, those on tergite 3 touching fore-margin of the tergite, those on tergite 4 occupying just over half of tergal length; these spots sometimes reduced, the spots on tergite 3 smaller and poorly defined and those on tergite 4 absent, these spots rarely even absent. Tergites without setae, except for tergite 5 which has 2 or 3 pairs of lateral discals and a row of marginals. Ventral part of tergites and sternites whitish dusted, but in posterior view the sternites and much of tergites 1+2 to 4 dull to broadly darkened. Sternite 1 narrow, with several fine setulae on each side. Sternite 5 with the lobes broad, pale (Fig. 19).

Genitalia: Cercal plate deeply cleft dorsally and ventrally (Fig. 22). Surstyli simple (Fig. 23). Hypandrium with a pair of large rounded bulbous prolongations ventrally. Phallapodeme and epiphallus well developed. Praegonite large, spade-like; postgonite curved, without setulae. Aedeagus long and slender, the tip membranous, without trace of any armature.

Measurements: Length of body, 3.2–4.6 mm. Length of wing, 2.7–3.6 mm.

Female.

Differs from the male as follows:

Head: (Figs 20, 21): Frons broadening gradually and evenly from vertex to lunula. The setulae slightly stronger. Frons at lunula 0.45 of head-width at this point. Ocellar and vertical setae slightly longer, outer vertical not shorter than ocellar. 2 or 3 pairs of frontal setae, and above them with 2 pairs of orbitals, the lower one proclinate, the upper one directed backwards and slightly outwards, and outside them on the fronto-orbital plate with 2–4 short proclinate setulae. Profrons not so high and therefore less angular, the distance from profrons to ocellar tubercle 0.7 the distance from profrons to vibrissa (Fig. 20). Antennal flagellomere (and face) much shorter, 2.5 times as long as wide. Parafacial broader, 1.5 times as wide as width of flagellomere in profile. Lower anterior part of head not so enlarged. Gena rather narrower, below lowest eye-margin equal to only 0.4 of the depth of the eye.

Thorax: Scutum unmarked.

Legs: Mid femur with the posteroventral setae reduced to setulae. Hind femur bare ventrally except for 1 or 2 anteroventrals before apex.

Wing: Cross-vein dm–cu straight.

Abdomen: Tergites 3 and 4 without dark spots but sometimes with weak shadows where the spots of the ♂ would be. Ventral surface sometimes more grey. Tergite 5 with the marginal setae weak, only 2 pairs.

Ovipositor (Fig. 9): Tergite 6 as two broad plates; sternite 6 as a broad median rod. Tergite 7 as a pair of strongly sclerotised rods, each with a pair of small platelets at tip; sternite 7 absent, represented by a pair of bristle-dots. Tergite 8 as a pair of bars running down the side of the ovipositor; sternite 8 as a pair of small hind-marginal platelets. Membrane between segments 7 and 8 with tiny spicules. Epiproct, hypoproct and cerci setose, without spines. 3 spherical spermathecae.

Measurements: Length of body, 4.2–5.0 mm. Length of wing, 3.0–4.0 mm.

Variation: The silvery pruinosity on frontal vitta and on parts of the scutum is tinged with yellow in one of the Gambian ♀.

Other features that show variation are:

Setulae on vein R_{4+5} are present in 1♂ 4♀ from Angola and 1♂ from Senegal; absent in 1♂ from Angola, 7♂ 4♀ from Gambia, 2♂ 2♀ from Senegal.

Setulae on proepisternal depression are present in 1♂ from Angola, 3♂ from Gambia, 2♂ from Senegal; absent in all ♀♀ except two from Gambia.

Setulae on meron are absent in 1♂ 2♀ from Senegal and 3♂ 1♀ from Gambia.

Sternite 1 setulae are absent in 1♀ from Senegal.

Holotype: ♂ ANGOLA: Cuanza R. mouth, 40 miles S Luanda, i.1972, B. Stuckenberg (NMSA).

Paratypes: ANGOLA: same locality data as holotype, 1♂ 4♀ (1♂ 3♀ NMSA, 1♀ BMNH). GAMBIA: Tanji Bird Reserve, in *Ocypode* burrow on beach, 21.xi.1993, C.E. Dyte, 7♂ 4♀ (NMWC). SENEGAL: Plage Somone, dans terriers de crabe [in crab burrows], 4.x.1961, no collector given, 3♂ 2♀ (2♂ 2♀ MNHN, 1♂ BMNH).

Discussion: Of the two Senegal females, one is somewhat damaged (squashed) and has several sand grains adhering to the tip of the abdomen; it may have been collected whilst in the act of oviposition. The second female and one of the females from Gambia have the ptilinal sac still largely extruded, with several grains of sand stuck to it; this certainly suggests adult eclosion from a puparium buried in the sand.

Distribution: Known from seashore localities in Angola, Gambia and Senegal.

ACKNOWLEDGEMENTS

I am especially grateful to Brian Stuckenberg (NMSA) for making his fascinating collections of Muscidae available for study and for encouraging me to describe these new taxa. For the loan of the further material described here, I thank Christophe Daugeron (MNHN), John Deeming (NMWC) and Raymond Gagné (USNM). I also thank Brian Stuckenberg and Peter Dyte (Datchet, U.K.) for their field notes on *Ocypodomyia*, Brian Stuckenberg and John Deeming for their careful reviews of this manuscript, and Greg Davies (NMSA) for taking the SEM picture of *O. africana*.

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